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LEARNING DIFFERENCES RESULTING FROM TEACHER- AND STUDENT-CENTERED TEACHING METHODS.

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THIS INQUIRY INTO THE EFFECTS OF GREATER LEARNER AUTONOMY ON ACHIEVEMENT AMONG TEACHER EDUCATION STUDENTS COMPARED A LECTURE-DISCUSSION METHOD USED IN REGULAR CLASS MEETINGS WITH A "CONTINUOUS PROGRESS" METHOD IN WHICH STUDENTS HAD ONLY TWO FORMAL CLASS MEETINGS DEVOTED TO PROCEDURAL, NOT SUBSTANTIVE MATTERS. ONE CONTROL AND ONE EXPERIMENTAL CLASS (TAUGHT BY THE SAME INSTRUCTOR) AT BRIGHAM YOUNG UNIVERSITY WERE INVOLVED. IN THE EXPERIMENTAL METHOD THE STUDENT WAS GIVEN A PACKET CONTAINING A LIST OF BEHAVIORAL OBJECTIVES, INSTRUCTIONS, A LIST OF ASSIGNMENTS, STUDY GUIDE QUESTIONS, INTRODUCTORY READINGS, AND, FOR SOME UNITS, A WORKSHEET. HE WAS TESTED UPON COMPLETION OF EACH UNIT AND MOVED TO THE NEXT UNIT IF HE PASSED. IF NOT, HE REPEATED THE UNIT AND WAS RETESTED, SOMETIMES ON A DIFFERENT FORM OF THE TEST. ON A 75-ITEM CRITERION TEST (ALSO USED AS A PRETEST), SIGNIFICANTLY HIGHER POST-TEST SCORES WERE EARNED BY THE CONTINUOUS PROGRESS STUDENTS. SIGNIFICANT DIFFERENCES IN FAVOR OF THE EXPERIMENTAL METHOD WERE FOUND FOR THE 10 STUDENTS WITH THE LOWEST GRADE-POINT AVERAGE, BUT NOT BETWEEN THE TWO GROUPS OF 10 STUDENTS WITH THE HIGHEST GRADE POINT AVERAGES. RESULTS WERE CONSIDERED TO JUSTIFY MORE EXTENSIVE INVESTIGATION OF THE EFFECTS OF INCREASING STUDENT AUTONOMY FOR LEARNING. THIS PAPER WAS PRESENTED AT THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION ANNUAL MEETING (NEW YORK, FEBRUARY 16-18, 1967). (AW)

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LEARNING DIFFERENCES RESULTING FROM TEACHER- AND STUDENT-CENTERED TEACHING METHODS[1]

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For practically two centuries American higher education has proceeded on the assumption that learning takes place best according to the following pattern: the student, in residence at the college, attends a fixed number of professor-directed classes meeting regularly throughout a 10 or 16 week period two or more hours per week. Completing certain assignments made by the professor and answering satisfactorily certain questions asked by the professor, the learner is then credited with a certain number of units. When sufficient units have been accumulated, the learner may redeem them for a diploma. Commenting on this "package" approach to education, the Fund for the Advancement of Education says, "These units may be administratively advantageous, but it is by no means clear that their use makes for the best education for the students...."

One way to modify this traditional pattern of teaching-learning is to give the student more responsibility for his own learning. Some educators have maintained that the teacher at best can only establish at atmosphere for learning; the student must learn as a result of his own effort.

Attempts to do this, to increase the learner's responsibility for his learning run like a single thread through the fabric of college teaching. Known among other designations as programs of independent study, honors courses, and

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self-directed study, these approaches have sought to center the teaching-learning process more on the student and less on the teacher. Evidence gathered about these teaching approaches has frequently shown "no significant difference" between the quality and quantity of learning of students taught this way and that of students receiving instruction in the conventional lecture-discussion format.

Another form of student-centered teaching has been studied at Brigham Young University: Continuous Progress. This approach differs from those already mentioned. Some characteristics of Continuous Progress are:

1. A one:many teacher-student relationship.
2. Standard catalog courses can be put in this format.
3. All or nearly all formal meetings of the entire class are eliminated.
4. Provision is made for individual conferences with the instructor.
5. Students progress at an individually-determined rate.

Typically a unit involves the following sequence of activities:

A packet of material is given the student. Contained in the packet are (1) a list of behavioral objectives, (2) instructions, (3) a list of assignments - reading and written, (4) study guide questions, (5) introductory readings, and, in some of the units, (6) a worksheet.

Next, the student completes the assignments for the unit. Finally, he takes the unit quiz. Passing the quiz allows the student to proceed to the next unit; failing it necessitates that the student study again the unit materials and take the quiz, sometimes a different form, a second time. This procedure is followed until the student passes the quiz.

The student is notified that he may confer with the instructor (including two graduate assistants) during the scheduled class hours. In addition he may make an appointment for a time other than these hours.

Continuous Progress has been implemented at the Brigham Young University Laboratory School since 1959 and has emphasized the areas of individualized instruction, nongraded curriculum and organization, development of self-instructional materials, techniques of independent study and small-group instruction, better utilization of language laboratories and instructional materials centers, continuous progress testing and record keeping, and flexible scheduling on a daily basis through the use of a computer.

We felt that the application of Continuous Progress principles to our teacher education program might yield data that would support innovation in the area of increasing student-centeredness of college teaching. The purpose of this study was to determine if there is a significant difference in learning between students who complete a teacher education course on a Continuous Progress basis and those who complete the same course on a conventional lecture-discussion basis.

Procedures

Two regular classes of the initial teacher education course at B.Y.U., comprised of sophomores and juniors majoring in secondary education subject areas, were designated as the control and experimental groups. Both groups were taught by the same instructor. The control group learned under the conditions of the lecture-discussion format; the experimental group was taught using principles of the Continuous Progress method. During the semester the latter group met as a formal class only the first two regularly scheduled meetings (for testing and procedural instructions). Thereafter these students proceeded at their own rate through nine units of prepared materials.

An objective examination intended to measure knowledge of course content, consisting of 75 items, was devised to serve as the criterion for the

study. It was administered as a pre-test at the beginning of the course and as a post-test at final examination time 16 weeks later.

Findings

The post-test scores of the control and experimental groups were compared using the t ratio for unmatched samples. Inasmuch as we had arbitrarily designated the two participating classes, we felt there would be no significant differences between them which would affect our research. Comparison of the pre-test scores (Table 1) shows that in fact the groups performed as if they were from the same population.

Table 1

t Ratio, Means, and Standard Deviations for Pre-Test of Control and Experimental Groups

Group	Standard Deviation	Mean	Standard Error of a Mean	t ratio
Control	11.37	82.09	1.71	.904
Experimental	12.78	84.35	1.81	

Table 2 reports scores on the post-test where it can be seen that the experimental, Continuous Progress-taught group performed significantly better than the control group.

Table 2

t Ratio, Means, and Standard Deviations for Post-Test of Control and Experimental Groups

Group	Standard Deviation	Mean	Standard Error of a Mean	t ratio
Control	11.38	110.91	1.72	3.56**
Experimental	8.50	118.68	1.34	

**Significant at .01 level

The significant difference on the post-test scores in favor of the experimental group was somewhat unexpected. Typical studies from the past reporting comparisons between one form of student-centered teaching and conventional teacher-centered teaching have yielded "no significant difference," or a slightly favorable difference in favor of the student-centered approach, but seldom at the .01 level of confidence.

In an effort to ascertain if the differences in performance were related to academic achievement, the ten highest and the ten lowest grade point averages were found for each group. The scores on the post-test were then compared: control highest ten with experimental highest ten and control lowest ten with experimental lowest ten. Tables 3 and 4 summarize these comparisons.

Table 3

t Ratio, Grade Point Average Means, Post-Test Means, and Standard Deviations of Ten Highest Grade Point Averages

Group	Mean of G.P.A.	Post-Test Mean	Standard Deviation	S.E.M.[a]	t ratio
Control	3.477	121.6	6.93	2.31	1.564
Experimental	3.386	126.8	6.33	2.39	

[a]Standard Error of a Mean

Table 4

t Ratio, Grade Point Average Means, Post-Test Means, and Standard Deviations of Ten Lowest Grade Point Averages

Group	Mean of G.P.A.	Post-Test Mean	Standard Deviation	S.E.M.[a]	t ratio
Control	2.312	103.8	13.12	4.34	2.577*
Experimental	2.300	116.3	5.57	2.11	

[a]Standard Error of a Mean
*Significant at .05 level

The results of these comparisons suggest that the low grade point average group performed better as a result of receiving Continuous Progress instruction than did their counterparts who completed the course under conventional methods of instruction. These results are interesting because generally the literature holds that the academically more able profit more from courses using an independent study approach than those less able. The students with the highest grade point averages benefited comparatively less from the Continuous Progress approach, although they performed slightly better on the post-test than did the conventionally taught students of similar ability.

Conclusions

Since the null hypothesis was formulated, a significant difference in favor of either group would cause its rejection. However, it is important to note what is implied about college teaching by the failure to reject the null hypothesis. In the present experiment, the students in the experimental section met only twice in a formal class with the instructor during a sixteen week semester. Those two meetings were procedural and did not involve presentation of course material. The control section, on the other hand, held 31 professor-directed class sessions, of which 28 were attended by nearly all the members of the class.

Acceptance of the null hypothesis would mean that students who did not meet regularly, whose responsibility for their own learning was increased, learned (according to the measure employed) as much as students who spent 28 to 31 hours in an instructor-centered class. Such a result could be considered somewhat disconcerting in view of our teaching practice of the last two centuries. Gruber put it aptly when he wrote,

> Research workers in the field and in the laboratory recognize that educational experiments in student-centered teaching fail to yield dramatic...results.... However, these failures to find striking

> superiority of self-directed study should not be interpreted as representing empirical support for the unfounded American decision to subject college students to some 2,000 lectures in four years.

The significant difference found in the present study in favor of the experimental, Continuous Progress group of course raises even more questions about our long-held assumptions about how college students learn.

To us the conclusion appears inescapable: we have plenary justification for more extensive investigation of the effects of increasing student autonomy in the area of their own learning.

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